

INSIGHT

National Council On Systems Engineering

SEPTEMBER 1994

ISSUE 5

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PRESIDENT'S CORNER

George Friedman

The miracle continues! Despite the pressures that have constrained every other identifiable professional organization, NCOSE is still enjoying a youthful vigorous growth. Our symposium continues the previous record of ever-increasing attendance and our membership is over twenty times greater than what we had at our Chattanooga beginnings. Even more important is the external recognition we are receiving from the Defense Systems Management College (DSMC), the Council of Defense and Space Industrial Associations (CODSIA), the Institute of Electrical and Electronic Engineers (IEEE), the Society of Automotive Engineers (SAE), the American Institute of Aeronautics and Astronautics (AIAA), the Software Engineering Institute (SEI), and the Accreditation Board for Engineering and Technology (ABET), Inc.

Our quality strategy is paying off. We are launching our professional journal, "Systems Engineering", this year and starting in 1995 we will jointly publish with the IEEE, which will provide us entry into over a thousand libraries worldwide. We are deeply involved in cooperative establishment of standards, capability assessments, and metrics with other organizations. We agreed to develop a new systems engineering guide for DSMC.

We are on a path to establish a presence for systems engineering within ABET and to substantively influence the systems engineering curricula in several colleges and universities. Finally, we are establishing a ladder of membership grades which will provide professional recognition for our outstanding contributors without falling victim to the possible problems that a fixation on grades only may engender.

Best of all, our San Jose symposium re-

sembled a hive of bees, buzzing with enthusiasm, sharing viewpoints, and building an idealistic vision of what we can become: a rational force for effective systems engineering and the management of complexity.

Issues Before the Board of Directors.

During the San Jose symposium, the NCOSE Board of Directors grappled with a multitude of issues, most of which were directly associated with our rapid growth. These issues include:

- A new budget and planning system. So far in our short history, we have played a very cautious financial game plan. The resulting healthy financial reserves have permitted us to step up to the full risk of running a major symposium -- and to reap the full rewards -- as well as strengthening our membership management, communications, and the launching of a high quality professional journal.
- Rebalancing the Bylaws and Constitution. We will be performing a major overhaul of the Bylaws and Constitution to provide us greater flexibility in responding to future change and to be responsive to local jurisdictions.
- Internationalization schedule. Our long range plan targeted 1996 as the year that NCOSE would go international. We must start anticipating what we must do in advance of that date in order to effect an orderly transition.
- Membership grades. The last issue of the newsletter contained a letter that expressed concern that establishing membership grades had disadvantages. The board reconsidered the issue of membership grades and reaffirmed that NCOSE's goal of promoting our profession demanded that we establish grades to recognize the major contributors. The possible negatives were considered to be avoidable rather than inevitable.
- Formalization of relationships with outside organizations. On a case-by-case basis, relationships with DSMC, CODSIA, IEEE, SEI, SAE, ABET, and AIAA were considered and specific guidance provided.

- Establishment of SYSTEMS ENGINEERING, the NCOSE Journal. Based on the Board's January decision, the first issue of the Journal is well underway and is scheduled to be published this autumn. Two issues are scheduled for 1995 and four for 1996 and thereafter. One issue each year will be jointly published with the IEEE starting in 1995.

- Appropriate level of sponsorship and publication authority. NCOSE must be careful regarding the appropriate "seals of approval" given to standards, handbooks, capability assessment models and metrics. Discussion of these issues was very spirited and easily took more of the board's time than any other issue,

- Accreditation and development of Systems Engineering Curricula. The results of Monday's academic workshop were briefed to the board and it was decided to pursue the possibility of NCOSE's involvement in ABET and curricula development for systems engineering. The academic representation in the workshop was a formidable majority of the nation's systems engineering professors.

- Future Symposia. Because of the financial and reputational importance to NCOSE of our symposia, the board has always taken a detailed interest in their management and the delegation of authority to the local chapters running them. The 1995 St. Louis and 1996 Boston symposia were reviewed in great detail.

INSIGHT

This publication is a product of the Communications Committee, part of the National Council On Systems Engineering (NCOSE).

Editor: Valerie Gundrum. Contributing editors include: Ellen Barker, Pat Hale, Terry Robar, James Sanchez, Sarah Sheard, Bill Schoening, George Vlay. (Many thanks, guys!)

INSIGHT is published four times per year: March, June, September, and December. All inputs for the December issue are due November 30, except for paid ads, which are due November 18. Direct your inputs and inquiries as follows:

Letters to the Editor; Articles from Committees, Boards, Working Groups; Paid Ads; Employment Ads:

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NCOSE COMMITTEES and BOARDS

Budget and Finance

Ken Ptack, Chair

The Budget and Finance Committee purpose is to address budget and financial issues that impact NCOSE. As such, they provide recommendations to the NCOSE Officers and Board of Directors. Ken Ptack, from the National Capital Area Chapter, is the current Budget and Finance Committee Chairman, Barney Roberts, from the Texas Gulf Coast Chapter, is the current NCOSE Treasurer. Barney Morais, from the San Francisco Bay Area Chapter, is currently serving as the Executive Director of NCOSE.

As of 9 August 1994, we have registered member number 2040 and have over 1400 active dues paying members. We are continuing to collect membership renewal dues and update our database, to include local chapter membership and affiliation. Please remit your dues and update your address information when you receive your first renewal notice. This will ensure that we have accurate information in our database plus will help reduce the administration cost of additional notices. Our dues renewal collections and new membership dues should support our approved 1995 Budget and planned cash flow.

Barney Morais provides support to the Officers and Board of Directors, plus maintains the NCOSE library and official membership list as part of his duties. Please contact him with any questions on current membership status or questions on NCOSE.

Membership

Phil Altomare, Chair

Mission: To actively expand participation and membership in NCOSE through individual memberships, corporate sponsors and the establishment of local chapters.

Goal: The five year goal is to achieve 5000 individual members, 30 corporate sponsors and 50 local chapters. Phil Altomare assumed the Chair for the Membership Committee at the San Jose Symposium. He has requested that each local chapter nominate a representative to the National Committee.

The committee has produced a new color NCOSE poster (8x11" size) that was distributed to the local chap-

ters at the symposium. We are also revising the trifold brochure which will be available by 1 October. All members are requested to take NCOSE information with them if they are attending related conferences. This simply involves requesting the material from Phil Altomare or John Olsen and placing it out on the table in the registration area normally provided for information distribution. The five level membership grade structure has been further definitized. The membership will have the opportunity to review and vote on this structure as part of the Bylaws update early next year.

Obtaining corporate membership has been going very well - we now have 14 corporate members. The initial list of target companies has nearly been achieved. But, we are looking for new champions to assist in gaining their corporations' commitment. Contact John Olsen (714-441-9152, JDOLSEN@HAC2ARPA.HAC.COM) if you would like to be a champion and for information and applications.

Ways and Means

Mike Wood, Chair

1994 is the year of reformation for NCOSE. The organization has grown tremendously in the last two years and its operation continues to evolve to best satisfy our customer - members. Ways and Means has undertaken the challenge to update the NCOSE Charter documents. First, the constitution and bylaws must be brought into compliance with California Code of Law for nonprofit corporations. Secondly, NCOSE needs policies and procedures documented to more effectively execute its business in serving the membership.

Presently, we have consolidated the current constitution and bylaws into a single ruling document, the Revised Bylaws. Your Board of Directors has reviewed the first draft and comments are being incorporated. The plan is to achieve the Board's approval at the NCOSE Winter 1995 business meeting and present the Revised Bylaws for membership approval by ballot in the spring of 1995. Your local chapter presidents will inform you of the balloting process following the winter business meeting. Formal NCOSE policy and procedure preparation has just started. Many directives from the Board as well as committee operating plans are in place. These require more formal documentation. Drafts from the various NCOSE committees are due to Ways and Means by year end. Review, integration, and submitting final drafts for Board approval and release will occur in first half of 1995. The goal is to wrap-up this effort by the start of the 1995 NCOSE Symposium.

Local Chapter Affairs

Richard Wagner, Chair

Another year has passed and we've just completed the 4th Annual International Symposium of NCOSE. I'd like to share some information concerning local chapter affairs with the members of NCOSE who were unable to attend the symposium.

First, I'd like to thank Nancy Rundlet, Liberty Chapter, for her help over the last six months and mention that she has volunteered to take over as the Chair of the Local Chapters Committee in January 1995. Secondly, we've grown from nine chapters in August 1993 to seventeen chapters in August 1994. The names, locations, and presidents of chartered chapters will be mentioned elsewhere in the newsletter. Third, we also have nineteen emerging chapters that include efforts by folks in United Kingdom, Australia, Canada and fourteen energetic groups within the United States. These emerging chapters are:

United States:

- Albuquerque, NM
- Atlanta, GA
- Boulder, CO
- Central Florida
- Chicago, IL
- Las Vegas, NV
- Los Angeles, CA
- Minneapolis/St. Paul, MN
- Newport News, VA
- Orange County, CA
- Philadelphia, PA
- Salt Lake/Ogden, UT
- San Antonio, TX
- Thousand Oaks, CA

International:

- Australia
- United Kingdom
- Calgary, Alberta, Canada
- Ottawa, Ontario, Canada
- Winnipeg, Manitoba, Canada

By the end of this year, NCOSE will be a true international society when our fellow members in the United Kingdom hold their first meeting of the UK Chapter and are chartered later this fall. So congratulations to the first international chapter of NCOSE. With any luck, there will be close to forty chapters in NCOSE by August 1995 due to the energetic efforts of the other points if contact of the other emerging chapters.

If you are interested in starting a local chapter, just give me a call (phone: 801-774-7892, Fax: 801-774-7930).

Communications Committee

Sarah Sheard, Chair

The Communications Committee charter is to provide communications support and services for NCOSE, and includes:

1. Coordinating inputs to a newsletter and provide camera ready copy to the Exec Director on a quarterly basis.
2. Investigating communications needs for NCOSE members in order to recommend a communications architecture to meet those needs, and
3. Serving as a focal point for distribution of information from subgroups of NCOSE to other subgroups of NCOSE (actual mailing is done by Exec Director).

Leading the Communications Committee are Chair, Sarah Sheard, and Co-Chair, Bill Schoening, who also manages the NCOSE e-mail directory (see related article). Other responsibilities are World Wide Web Investigation (David Altman), symposium coordination (Ellen Barker), and *INSIGHT* Editor (Valerie Gundrum). Our current priorities are:

1. Getting the newsletter published on a quarterly basis to provide high quality broadcast communications to members.
2. Ensuring the development and publication of a paper approval process,
3. Completing a quality function deployment assessment of NCOSE communications needs and designing a communications architecture to meet the needs,
4. Managing a long term implementation of the NCOSE communications architecture, and
5. Consider the establishing an actual or virtual library of NCOSE materials.
6. 1996 Symposium selection.

Additional help is always welcome!

Technical Board

Eric Honour, Chair

During our rapid growth of the past four years, we have had an equally rapid growth in motivated technical working groups. Under Larry Pohlmann's excellent guidance, groups started work in 18 different areas from commercial applications to military standard handbooks. However, by 1993, this became too much for one person to handle.

In January 1994, the President appointed a new Technical Board to coordinate and encourage the technical working activities. The Technical Board quickly created six Technical Committees (made up of the working group chairs) to handle specific areas of effort:

- Emerging Applications: Extension of systems engineering into new business areas.
- Measurement: Methods to measure systems engineering processes and effectiveness.
- Systems Engineering Development: Creation and development of systems engineers
- Systems Engineering Management: Methods to coordinate multiple engineering disciplines to create a system.
- Systems Engineering Processes & Methods: Description and implementation of standard technical methods.
- Tools & Automation: Cataloging, describing, and defining tools that can assist systems engineering.

By the August symposium all these newly-created bodies were hard at work. Each Technical Committee focuses on specific long-term technical goals for NCOSE in its area. The committees validated charters for the existing Working Groups, helping them to set goals that are useful to all members. They will charter new Working Groups as needed. The committees help to define tracks and to review papers for upcoming symposia. In general, each committee looks inward on the goals and products of its related Working Groups.

The Technical Board, on the other hand, looks outward to set and protect the NCOSE technical image. It focuses on long-term objectives, coordinating the Technical Committees to offer cohesive products to members (and the world). The Technical Board establishes five-year goals and it ensures the quality of NCOSE products through review and approval of the most significant products.

We are doing this primarily through e-mail with active, semi-parliamentary discussions. Some of the first issues we are solving are procedural: how to charter Working Groups, how to approve documents, even how to vote over e-mail. At and after the 1994 symposium, we passed some more important issues:

- Systems Engineering Standards. The Technical Board passed a resolution that NCOSE develop standards for systems engineering, and more, that NCOSE should take the lead in doing so among the several interested professional organizations. We chartered Jerry Lake's Standards and Handbooks Working Group to work with EIA, AIA, IEEE, and others to make this happen (see related article by Jerry Lake). We will review this issue again in January and pass financial recommendations to the Board of Directors.

- Capability Assessment Models. This issue is being handled within the Capability Assessment Working Group (CAWG), but the Technical Board has affirmed that NCOSE encourages the development of assessment models by any interested parties. The CAWG will be developing criteria to evaluate such models, and they will include considerations that apply to the whole NCOSE membership business base, not just military/aerospace.

- Five Year Plan. The Technical Board has set a vision for NCOSE five years in the future that includes:

- Established and respected standards for SE on multiple levels
- SE recognized and used in sectors other than military/aerospace
- Recognized standards and training methods for system engineers
- Widespread use of measurement techniques for systems engineering
- Statistically significant improvement in SE performance
-

The Technical Board is moving forward to guide the immense energy of this organization into effective improvements for all of us. We also identified specific objectives for 1995, '96, and '97. You'll hear more in future newsletters.

Corporate Advisory Board

Ginny Lentz, Chair

The Corporate Advisory Board membership is changing!! Since NCOSE '93, Boeing, Rockwell, TRW and PRC have joined. The changes in the Defense Industry are reflected in the Board composition in that LORAL is now a member (formerly IBM) and Northrop and Grumman are now Northrop-Grumman.

Other members of the CAB include Hughes, Ascent Logic, Motorola, Mitre, Aerospace, Martin Marietta, and Lockheed (Lockheed-Martin?). Honeywell is also a Corporate member of NCOSE.

The CAB functions as the "Voice of the Customer" for NCOSE and maintains a needs list to help NCOSE prioritize activities. The list was first generated in January 92 and the NCOSE Working Groups have been making excellent progress against the following needs:

1. Examples of commercial engineering and management processes that produced complex products.
2. SE capability assessment vehicle validation and evolution.

3. Usable outputs for metrics; SE benchmarking templates; essential elements of SE and best practices.

4. An information package that provides program management guidelines for applying SE on a program and a selected set of empirical data that demonstrates the cost, schedule, and quality benefits of applying SE or the regrets of not applying SE (this one is TOUGH!!).

WORKING GROUPS

Best Practices Working Group

Phil Altomare, Chair

The Best Practices Working group is developing a database to contain information on, references to, and electronic or hard copy access to descriptions of "Best Practices" recommended by the NCOSE membership for use in the practice of systems engineering. To build this database, an information format has been developed and a classification scheme proposed. At the August 1994 symposium a request for Best Practices recommendations was distributed to the attendees. Through the membership recommendations, distribution of proposed "Best Practices," and the recording of feedback from NCOSE users, it is intended that a reference set of systems engineering practices will be established for the purview of NCOSE members and sponsors.

"Best Practices," as used in our parlance, is more akin to: "good practices" that may be commonly used by NCOSE members; new, more effective methods; or procedures or processes that have been found to have application in special circumstances. We would like the database to be an information source to beginner as well as to the seasoned expert.

We would like your recommendations on candidates for "Best Practices," the structure of the database format, the classification scheme, as well as other developments. If you are interested, please contact Ralph Hill for information:

Ralph Hill
Phone: 301-601-5616
Fax: 301-601-0127
E-Mail: Ralph_Hill@ccmail.gmt.saic.com

See: Solicitation for Best Practices Recommendations on page 8 and Best Practices Data Base Taxonomy on page 15.

SE Process Working Group

Dick Wray, Chair

The systems engineering process working group (SEPWG) met several times at the '94 symposium. As a reminder to all NCOSE members, the charter of the SEPWG is:

To refine the Systems Engineering Process elements that are functional to a practicing Systems Engineer; and requirements for benchmarks, methodologies and techniques for the Systems Engineering Process.

SEPWG meetings were held to definitize the currently planned tasks to be accomplished in the working group. Other committees and working groups which are cooperating to define processes in common areas of interest were identified. SEPWG Process Interest Groups (IGs) were set up to define specific process task areas as noted below. Specific task responsibilities of these SEPWG IGs include preparing input/process/output charts, data dictionaries, review points, and coordinating with other IGs as needed for interfaces between IGs. The existing data base of SE process flow charts was distributed to each IG for consideration in developing the detailed process areas. Some of the joint IG members representing other WGs or committees have not been fully identified yet. These members should be identified as soon as possible.

Significant accomplishment has been achieved by the SEPWG, as briefed at the symposium in the baseline process described in our chair report which is currently out for voting (copies are in Vol. 2 of the 1994 Proceedings, and may be obtained by ordering that document from Barney Morais, see related notice on page 10).

The IGs formed under the SEPWG are:

1. The Systems Engineering Activity Interest Groups:
 - 1.1 Systems Engineering Support to Strategic Planning & Needs Definition - Joint with SE Management Committee
 - 1.2 Systems Engineering of Requirements - Joint IG with Requirements Management WG
 - 1.3 Systems Engineering Design - Joint IG with System Architecture WG
 - 1.4 Systems Engineering Support to Detail Design
 - 1.5 System Integration and Verification - Joint IG with Interfaces and Integration Committee
 - 1.6 Systems Engineering Support to Production, Post-Production & Validation
 - 1.7 Systems Engineering Management and Con-

trol - Joint IG with Systems Engineering Management Committee

1.8 Experiences of industry needed - New England Chapter

2. The Systems Engineering Process Engine Interest Groups:

2.1 Primitive process concept refinement - Washington DC Chapter

3. Other IGs:

3.1 Definitions & terminology under development - Joint IG with System Architecture WG

3.2 SE and ISO 9000 - under definition

Additional volunteers are always sought for the description of the process being assembled by the SEPWG. Send me an e-mail with your area of interest within systems engineering, and I will route your name to the IG leads as appropriate (713-334-5387).

Metrics Working Group

Bill Miller, Donna Rhodes, Ann Wilbur, Co-Chairs

The NCOSE Metrics Working Group (MWG) mission is to collect, develop, and exchange metrics information that pertains to the practice of systems engineering. The MWG is working toward a common vision of metrics, and has formed three subgroups to address its objectives:

(1) Current Practices Subgroup. This subgroup's charter is to communicate the current state of the practice, with its initial work product being a Metrics Guidebook. This subgroup is lead by MWG Co-chair Ann Wilbur, Loral Western Development Labs, (408) 473-6719. Contact Ann if you have materials you can share and want to be involved as a guidebook author or reviewer.

(2) Metrics Cent eS ubgroup. The charter of this subgroup is to provide access to metrics information by creating an information repository which will be accessible by NCOSE members. This group is led by MWG Co-Chair Bill Miller, AT&T Bell Labs, (201) 386-5339. Contact Bill if you have materials you would like to provide to the repository or wish to be listed as a metrics consultant.

(3) Metrics Advancement Subgroup. This subgroup's charter is to advance the state of the art in metrics, with its initial work product being a 1995 Metrics Research Progress Report. This group is led by MWG Co-chair Donna Rhodes, Loral Federal Systems, (607) 751-6102. Contact Donna if you are working with experimental metrics or innovative concepts in metrics, and would like to share your ideas in the 1995 report.

Be sure to read our MWG report in NCOSE 1994 Pro-

ceedings, Volume II, for more information. We'd value your participation in this year's activities; please contact any of the three co-chairs to join our group.

Tools Database Working Group

Roger Cook, Chair

The Tools Database Working Group, part of the NCOSE Tools & Automation Committee, has been chartered to specify and develop a database that identifies and characterizes tools that support systems engineering, for use by NCOSE members. Currently, the working group is capturing the Tool Taxonomy that was delivered by the Tools Taxonomy & Information Model Working Group at the 1994 NCOSE Symposium. Requirements provided by the Requirements Management Working Group and by NCOSE company members for requirements management tools will be captured and mapped into the taxonomy. The requirements will then be translated to a requirements verification matrix, which will be sent to tool suppliers. Their responses will result in a tool classification and corresponding mapping of tool requirements to that classification. The Database Working group will deliver a white paper of the results at the NCOSE winter business meeting.

For more information, contact Roger Cook (714-441-9620, recook@hac2arpa.hac.com) or Mark Sampson (214-669-9937, sampson@slate.tdtech.com), who are co-chairs of the Tools Database Working Group.

Tools Taxonomy Working Group

Dave Oliver, Chair

This working group was conceived for the purpose of developing a structure, or taxonomy, for classifying Systems Engineering tools. This taxonomy should help establish a common nomenclature for referring to tools and tool usage. It is also intended to provide a framework for describing system engineering tool interaction, and assist in mapping tools into the systems engineering process.

The paper published in Vol. II of the '94 proceedings describes a preliminary taxonomy, develops an initial information model for how tools interact, and partially maps a notional systems engineering process onto the tool information model. It is our intention to expanding the tool information model to represent more of the systems engineering process, and to work with the tools database working group in cataloging available requirements management tools. If you would like to help, please contact Rick Steiner <fsteiner@msmail2.hac.com> or Dave Oliver <(518) 387-6458, oliverdw@crd.ge.com>.

Concurrent Engineering Working Group

Mike Dick, Chair

This year, our efforts were focused on determining the unique contributions Systems Engineering can make to concurrent engineering. We approached this from two aspects. First, we listed the characteristics of CE and then related them to SE. We realized that the CE characteristics were the "how", SE was the "what". In other words, CE characteristics were more detailed than the corresponding SE characteristics. This approach was not fruitful.

The second approach was to list the key features of SE (from a draft of **Mil-Std-499B**) and select from them candidate features that may have use in CE. These candidates are:

- interface management
- requirements analysis and management
- risk assessment and mitigation
- functional/performance analysis
- verification and validation
- systems engineering planning

Based on **499B**, we will develop jargon-free definitions of the candidates and ask CE practitioners outside NCOSE if these features would enhance their capability to develop products efficiently. This project will enable us to coordinate with the Society of Concurrent Engineering.

Risk Management Working Group

George J. Vlay, Chair

The Risk Management working group met on Friday, 12 August 1994, during the 1994 Symposium in San Jose, California.

The Charter, Objectives, and 1994 Goals were reviewed and determined to be still valid. Accomplishments to date against the 1994 goals include the submission of a 40-page how-to document to the Systems Engineering Process Handbook developed by **MIL-STD-499B** Working Group. Joe Fiksel accomplished the task of reducing an 80-page draft that was prepared last year into the 40-page document.

The purpose of the task assignments is to obtain sufficient material for an independent Risk Management Handbook of 150-200 pages that would be a product of NCOSE to further the Systems Engineering Management activities. The WG made a recommendation that tool vendors with risk management software be encouraged to demonstrate their capabilities during the 1995 NCOSE

Symposium.

The Working Group established liaisons with the Metrics Working Group and the Systems Engineering Working Group.

Standards and Handbooks Working Group

Jerry Lake, Chair

Status Update on Systems Engineering Standards:

The secretary of defense implemented a Specifications and Standards Blue Ribbon Report on June 29 intended to eliminate/reduce use of military specifications on acquisitions. Future focus will be on industry standards. Since Mil-Std-499B was not signed out by the Office of the Secretary of Defense, there has been a scramble by various associations and professional societies to publish industry standards on systems engineering. Although NCOSE attempted to step up to the challenge, the Electronics Industry Association (EIA) was endorsed by the DoD preparing activity to prepare an industry standard to replace 499B. NCOSE, AIA, and NSIA representatives will participate on the EIA G-47 writing group.

During the NCOSE August 1994 symposium, the Standards and Handbook Working Group prepared a "de-militarized" 499 draft for an August G-47 meeting. The EIA final draft, scheduled for distribution by December, will be distributed to Local Chapters for information and review. In a parallel effort, the IEEE, with NCOSE representatives, is completing their P1220 Standard started in December 1989 to provide a commercial standard on systems engineering. It too is scheduled for publication by December 1994. Publication of each is dependent on approval by respective review agencies and compliance with ANSI requirements. ANSI requirements may bring about a combining of all SE standard efforts by EIA, IEEE, SAE, AIAA, and other agencies. NCOSE is looking to becoming ANSI accredited and the umbrella developer for future systems engineering standardization efforts.

In a related effort, the EIA G-33 (Data and Configuration Management), G-34 (Computer Resources), and G-47 (Systems Engineering) committees are meeting September 26-30 in Denver and planning work on preparation of non-government standards for ANSI registration: 973 (Configuration Management), 498 (Software Development and Documentation), and 31000 (Technical Data Packages). Additionally, CITIS/CALS, 100 (Drawing Practices), and SE CMM will be topics of discussion. [NCOSE has competition in becoming the "Voice for Systems Engineering."]]

Solicitation for Best Practice Recommendations

S. McHale

Objective Of This Solicitation. The Best Practices Working Group requests that members of NCOSE submit recommendations for successful and innovative systems engineering practices that may be disseminated for the benefit of NCOSE members and industry. Recommended practices will be evaluated and selected practices will be entered into a Best Practices Data Base for the benefit of all NCOSE members and others in the systems engineering user community.

Definition and Scope of Best Practices. The Working Group has defined a best practice as any specific action or practice that has been proven, within a defined context, to offer a significant advantage over other actions. The scope of this solicitation includes best practices from all aspects of the systems engineering process. Recommendations for best practices may come from practices that have been formally documented or published, or from practices that you are aware of that have shown proven performance benefits, but have not been formally documented or published.

Recommended Practice Information:

- Name of candidate practice
- Reference information, if applicable: title of paper with complete bibliographic reference, name of software, or other as applicable
- Brief description of practice
- Brief description of benefits or use

Recommendation Submitted By:

- Name
- Company
- Address
- Telephone.
- Fax

Submit Recommendations To:

Ralph Hill
SAIC
20300 Century Blvd., Suite 200B
Germantown, MD 20874

Telephone: (301) 601-5616 Fax: (301) 601-0127

See also: Best Practices Data Base Taxonomy on page 15

CALENDAR of EVENTS

September

22 - Seattle Metropolitan Chapter Board meeting

Invitation Only

Contact: Art Morrison, (206) 657-2539

22 - Colorado Chapter meeting

Speaker: Jack Ashburner, Ascent Logic Corp.

Topic: Risk Analysis

Place: Colorado Springs Embassy Suites

Contact: Bill Money, (719) 594-1468

29 - New England Chapter meeting

Speaker: Lynda Rosa, MITRE

Topic: Consequences of the Perry Reform - Industry Opportunities

Place/Host: The MITRE Corporation, Bedford, MA

Contact: Brian McCay, (617) 271-5727

October

6 - Seattle Metropolitan Chapter meeting

Speaker: Dr. Tom Greene

Topic: Introduction to QFD

Place: University of Washington, Bldg./Room: TBD

Contact: Art Morrison. (206) 657-2539

11 - Liberty Chapter meeting

Speaker: Brian McCay, MITRE

Topic: Use and Design of an Architectural Model in the Real World

Place/Host: AlliedSignal, Teterboro NJ

Contact: Bill Miller, (201) 386-5339

27 - New England Chapter meeting

Speaker: Rich Kohut, Martin Marietta

Topic: Engineering Process Improvement Program at Martin Marietta

Place/Host: Draper Laboratory, Cambridge, MA

Contact: Brian McCay, (617) 271-5727

27 - Colorado Chapter meeting, 5:30-8:30pm

Speaker: Nancy Rundlet, Zycad

Topic: Requirements Engineering and DOORS demo

Place: Embassy Suites, Denver Technology Center

Contact: Bill Money, (719) 594-1468

November

8 - Washington Metropolitan Area Chapter meeting

Topic: Officer Installation and TBD

Place: George Mason University Student Union

Contact: Joe DeFoe, (301) 493-1451, defoej@lfs.loral.com

10 - Seattle Metropolitan Chapter Board meeting

Invitation Only

Time /Place: TBD

Contact: A. Morrison, (206) 657-2539

18 - Colorado Chapter meeting

Topic: Client Server Migration (several tracks and speakers)

Place: Embassy Suites, Denver Technology Center

Sponsor: IEEE/ACM with NCOSE

Contact: Bill Money, (719) 594-1468

December

1 - New England Chapter meeting

Topic and Place: TBD

Contact: Brian McCay, (617) 271-5727

8 - Seattle Metropolitan Chapter meeting

Topic: Guest Speaker/ Banquet Dinner

Place: TBD

Contact: A. Morrison, (206) 657-2539

13 - Liberty Chapter Holiday Dinner Program

Topic and Place: TBD

Contact: Bill Miller, (201) 386-5339

January

11 - Washington Metropolitan Area Chapter meeting

Topic: TBD

Place: George Mason University Student Union

Contact: Dusty Rhoads, (703) 416-3759

12 - New England Chapter meeting

Topic: TBD

Contact: Brian McCay (617) 271-5727

24-27 - NCOSE Mid-Year Business Meeting

Place: Houston

Invitation Only!

For the December issue of *INSIGHT*, send event information for January through April 1995. Include locally sponsored events and meetings, and other symposia of interest. (Commercial training courses require paid ads; see article on page 19.) Send your event date, topic, speaker(s), place, time, and point of contact with phone to reference listed on page 2.

1994 Symposium Highlights

1994 NCOSE Symposium Status Report

The 1994 Annual International Symposium held in San Jose, California the week of August 8 was a great success. Six hundred eighty-five (685) people participated from both government and commercial companies across the country as well as from England, Canada, **Australia**, France, Germany, the Netherlands, Sweden, and Norway. This represents a 13% growth from the 1993 symposium.

The week began on Monday with an academic workshop. Aaron Shenhar from the University of Minnesota brought together representatives from industry to discuss the needs for education and development of systems engineers. Tuesday, five tutorials were presented by some of the field's leading authorities. There were from 30 to 70 attendees in each tutorial, ranging in topic from system development techniques, capability assessment, and concurrent engineering to train-the-trainer and the experience of the "all-stars". Tool vendor presentations were held on Tuesday as well. We heard about new tools as well as the latest developments in companies we have become familiar within past years.

This year, 162 papers were divided into five tracks - Management, Insights into Systems Engineering, Tools and Architecture, Systems Engineering Process, and Metrics and Applications. Thanks to all the presenters for their new ideas and continued work in each of these categories. The selection process for the high quality papers was accomplished by the 130 reviewers of the NCOSE technical working groups. The talks by our featured speakers on creativity, advancements on transportation systems and services, and developments in the Department of Energy as well as social activities made the conference enjoyable for the attendees and their families.

A new feature of the symposium this year was the availability of the past four years of proceedings on CD-ROM. Contact Barney Morais if you would like additional copies of the hard-bound or CD-ROM proceedings. Special thanks to the NCOSE Board members, San Francisco Bay Area Chapter, the St. Louis and Boston symposium planning committees, and Ellen Barker and her staff for the success of this year's symposium.

Outstanding Paper Presentation Winners

Track I: Management

Developing a Capability Maturity Model for Systems Engineering

Dorothy Kuhn, Texas Instruments Inc.

Track II: Insight into Systems Engineering

Systems Engineering and Object Technology

David Oliver, GE Corporate Research and Development

Track III: Tools and Architecture

The Systems Architect: Specialty, Role and Responsibility

Eberhardt Rechlin, University of Southern California

Track IV: Process

The Allegory of the Humidifier: A Case Study of Return on Investment in Systems Engineering

Mark Sampson, Texas Instruments, DSEG

Track V: Metrics and Applications

Revitalizing Product Development at the Edelbrock Corp.

Jack Ring, The Innovation Management Group

REMINDER: HARD COPIES OF THE 1993 AND 1994 SYMPOSIUM PROCEEDINGS ARE AVAILABLE FOR \$60.00 plus \$10.00 SHIPPING AND HANDLING. PLEASE CONTACT BARNEY MORAIS AT: (408) 773-8701.

Macintosh CD-ROM Notice

Lew Lee

The CD-ROM "Proceedings of the Fourth Annual International Symposium of the National Council on Systems Engineering with the Supplement of 1st, 2nd, and 3rd Symposium Proceedings" as released in August 1994 is not compatible with all Macintosh platforms. The compressed file "DW_MAC.SEA" that creates the applications folder had to be recompiled to be compatible with Macintosh operating systems from 6.0.5 to 7.1.

DOS and Windows applications are not affected by the update.

To obtain the updated CD-ROM disc:

1. Mail your disc (only the disc -- please retain the plastic case because you will need it to house the updated disc) to:

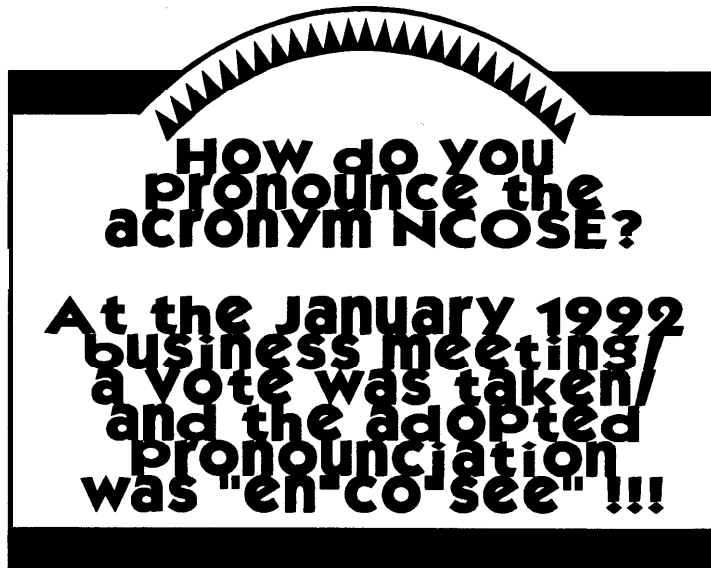
NCOSE CD-ROM Exchange
333 Cobalt Way, Suite 107
Sunnyvale CA 94086, USA.

2. Include your name, NCOSE membership number and mailing address with the disc (the updated disc will be properly packaged for mailing).

In approximately two weeks, you will receive the updated disc. Technical questions regarding the software update can be directed to the 1994 CD-ROM Chair:

Lew Lee
POB 3510 m/s 503
Sunnyvale CA 94088-3510 USA
voice: 408-743-4200, ext 5090
fax: 408-743-2825, E-mail: lal@esl.com

Thanks to Larry Pohlmann for the following:



Local Chapters & Contacts

Chapter Name Region/State	Contact	Telephone Fax
<i>Seattle Metropolitan</i> I/ Washington	A. Morrison	(206) 657-2539 (206) 657-0071
<i>Tri-Cities / Richland</i> I/ Washington	M. Simpson	(509) 375-4539 (509) 375-6417
<i>San Francisco Bay</i> II/ Sunnyvale Calif	T. Robertson	(415) 851-7680 (415) 851-0654
<i>Inland Empire</i> II / San Bernardino CA	A. Vickers	(909) 862-0635 (909) 862-0635
<i>San Diego</i> II/ California	S. Bertic	(619) 536-8743 (619) 536-8743
<i>Southern Arizona</i> II/ Tucson Arizona	W. Wymore	(602) 299-6663 (602) 795-6037
<i>Colorado Springs</i> III/ Colorado	W. Money	(719) 594-1468 (719) 599-3370
<i>Midwest Gateway</i> III/ St. Louis Missouri	D. Bristow	(314) 232-7166 (314) 234-6934
<i>Texas Gulf Coast</i> III/ Houston Texas	G. Moorman	(713) 333-6422 (713) 333-7620
<i>North Texas</i> III/ Dallas-Ft. Worth TX	J. Nallon	(214) 669-9937 (214) 669-9938
<i>Liberty / Rockaway</i> IV/ NJ, NY, PA	N. Rundlet	(201) 989-2934 (201) 989-2940
<i>Tri-State / Detroit</i> IV / Michigan	J. Bedocs	(313) 390-9100 (313) 337-9572
<i>New England</i> IV/ Boston Mass	B. McCay	(617) 271-5727 (617) 271-5309
<i>Washington Metro</i> V/ Washington DC	D. Rhoads	(703) 416-3759 (703) 416-3329
<i>Chesapeake</i> V / Baltimore Maryland	N. League	(410) 628-3076 (410) 628-3582
<i>Huntsville</i> V/ Alabama	H. Sachs	(205) 461-3994 (205) 461-2787
<i>Space Coast</i> V/ Melbourne Florida	E. Honour	(407) 242-5192 (407) 242-4249

LOCAL CHAPTER **NEWS**

Seattle Metropolitan Chapter

Art Morrison

The most recent Seattle Metropolitan Chapter (SMC) meeting topic was presentation of the National Symposium papers that were written by SMC members. The meeting was held July 28, 1994 with approximately 45 members in attendance. Five papers were presented.

1. "An Integrated Approach to Complex Systems Analysis and Performance Simulation" by Kenneth J. Peterson (page 213)
2. "Requirements for Systems Engineering Metrics" by Timothy J. Vinopal (page 771)
3. "ASEM - A Simple Engineering Training and Personal Automation Tool" by Carolyn Whitten (page 369)
4. "Applying Systems Engineering and Icon-Driven Simulation Techniques to the Waste Disposal Problem at Hanford, WA" by Alan Keizur (page 873)
5. "Requirements for Development of Software Requirements" by Dr. Brian W. Mar (page 39)

This was the second year of having a meeting just prior to the symposium and has been popular with both the SMC members and the presenters.

Chapter Issues/Initiatives - Local and National Level. A committee of SMC members, led by Mike Wood, formed following the national winter business meeting in January, has prepared an integrated revision of the National Constitution and Bylaws that is currently under review by the National Board of Directors.

The SMC technical committee, led by Derek McBrinn, assembled a draft systems engineering term source glossary in the March to May time frame that was distributed and discussed interactively by a technical committee panel at the June Chapter Meeting held at Advanced Technology Laboratories (ATL). Further development of this glossary is an ongoing technical committee activity.

SMC transitioned from local to national collection of NCOSE dues this year. This change has been a major administrative challenge. The renewed commitment made at the symposium by the national board and relevant committees was encouraging, and SMC is looking forward to quick resolution of this issue.

Local Area News: John Wirth, SMC member and pre-

vious national Communications Committee Chair, was recently selected for a Boeing systems engineering scholarship, beginning this fall, at the University of Washington

Tri-Cities Area Chapter

Mary Simpson

The Tri-Cities Area Chapter (TAC - Richland, Washington) of NCOSE held monthly non-dinner meetings during its formative 1993-1994 year. The meetings featured national and local speakers. Presentation topics alternated between general SE areas and specific applications of SE. At the time of the April 1994 election, our chapter had thirty-nine "founding" members, with an "interested party" mailing list of 110 people. The attendance at each meeting averaged 35 to 40 people. TAC concluded its 1993-1994 year with the installation of its officers (half during the May meeting and the remaining half during the June meeting). The upcoming 1994-95 year begins with a 13 September presentation by NCOSE's Phil Altomare, followed by an October panel meeting featuring highlights of the 1994 Symposium.

New England Chapter

Brian McCay

The final '93-'94 New England Chapter meeting was hosted by Polaroid Corporation in Dover, MA, on June 9th with approximately 20 attendees. This meeting marked the end of a series of meetings dedicated to identifying a common technical thrust of interest to many chapter members. Chapter President Brian McCay reported on the results of the ad hoc Steering Committee, which by consensus determined that the general focus of the chapter over the next two years would be use of tools to support the systems engineering process and cultural challenges in introducing tools. A Technical Focus group headed by President-Elect Pat Hale has been formed. This group will act as an Interest Group within the Tools and Automation Technical Committee. Its first order of business is the creation and distribution of an electronic survey regarding the support of tools to the systems engineering process. Look for it soon, hopefully on the NCOSE Bulletin Board!

'96 Symposium Planning under the direction of Chairperson Don Neuman continues on a regular basis. Boston hotel selection will be made by late September. In conjunction with our detailed planning, our general focus is on deciding on a symposium theme and assisting in the success of the '95 Symposium in St. Louis.

Officer and Director committees have been formed to strengthen the chapter, improve chapter

communications with other NCOSE elements, and to recruit new members within the commercial sector. An outstanding issue is how to involve our members more actively throughout New England. Initiatives to address this issue include holding meetings in each of the New England states and arranging social events in these areas during the '96 Symposium. The '94-'95 schedule of speakers is still being finalized.

San Francisco Bay Area Chapter

Ron Olson

Members from the SFBAC took a bit of a breather from the August symposium and had their next meeting on September 13th. The subject of the invited speaker, Yngvar Tronstad, was a comparison of the object-oriented analysis methodologies for systems engineering. Attendance has continued to be strong at the monthly meetings. Topics for the rest of the year planned by our President Tim Robertson include "Lean Design - Lessons from Iridium Systems Engineering", and a presentation by Jim Brill, NCOSE president-elect on "NCOSE Challenges of 1995".

A recurring theme in our monthly programs in 1994 has been how different companies have been applying systems engineering to their various programs. We have heard about Lockheed programs from three different divisions: Missile System's Launch Vehicle Program, Space System's Milstar Program, and a proposed commercial transportation information system from Lockheed Information Management Services Company. Loral Space Systems described their innovative techniques for implementing concurrent product development on their new line of commercial communications satellites. The Director of San Jose State University's Center for Productivity and Manufacturing Engineering presented a systems approach to organizing, improvement and learning for improving productivity and quality in work processes.

Liberty Chapter

Bill Miller

The Liberty Chapter (NJ/NY/PA) continues to have a successful program serving people in the tri-state area and parts of Connecticut. Programs are attracting between 30 to 40 people and have varied in form and content. Dr. Burton Masnick (Hazelton, Greenlawn, NY) presented "Classical Design of Experiments versus the Taguchi Method," on March 7. Dr. Richard Stevens (QSS Ltd, Oxford, UK) presented a "Structured Approach to Requirements," on April 18. The Liberty Chapter held its first anniversary dinner on June 7 with the formal program "The State of Systems Engineering in Local Organi-

zations," a panel discussion by the heads of six systems engineering organizations,

The summer programs were held on July 13 at Grumman (Bethpage, NY) and on July 19 at Loral (Yonkers, NY) with the topic "Selected Papers to be Presented at the 1994 NCOSE International Symposium."

The next program is scheduled for October 11 at AlliedSignal (Teterboro, NJ). The presenter is Dr. Brian McCay (MITRE, Bedford, MA), "Use and Design an Architectural Model in the Real World." The point of contact is Bill Miller at 201-386-5339 or william.d.miller@att.com. The Holiday Dinner Program is tentatively scheduled for December 13.

Local Chapter elections for officers and directors will be held this autumn. Members affiliated with the Chapter are encouraged to run for office or to help run the election process. Contact Dick Koppenaal (201-724-7048) for information.

Colorado Chapter

Bill Money

A Colorado Chapter meeting was held on August 4th at the Colorado Springs Embassy Suites. A social hour allowed local members to network and discuss SE topics of interest. The feature presentation was "SE Capability Maturity Model" by chapter president Bill Money. General discussion followed in addition to NCOSE business and preview of the national conference.

A 22 September meeting will be held at the Colorado Springs Embassy Suites with a pre-meeting social hour. The main topic will be Risk Analysis. The feature presenter will be Jack Ashburner of Ascent Logic with a demonstration and talk on Risk Analysis.

The October meeting will be held in Denver with the feature presentation on Requirements analysis/management. A joint meeting with IEEE/ACM/DPMA and the local NCOSE chapter will be held in Colorado Springs. The topic of the eight hour meeting will be Client Server Migration. There will be four tracks of interest: 1) C/S development, 2) C/S architecture, 3) Business reasons for migrating to C/S with case studies, and 4) human factors issues relating to migrating to C/S. Each track will have three speakers and associated vendors.

Texas Gulf Coast Chapter

Gerry Moorman

The Texas Gulf Coast Chapter (TGCC) held two general membership meetings this past summer, both dealing with systems engineering on the International Space Station Alpha (ISSA) Program from the perspectives of NASA and the Boeing prime contractor. The speakers

were Dr. Dale Thomas, Manager of the ISSA Vehicle Integration Team, and Mr. Brad Cohen, Principal Systems Engineer for ISSA at Boeing. Attendance at each meeting was in the 40-50 person range and the perspectives were very well received.

The meeting schedule has not yet been firmed up for the fall and winter, but topics will include a review of the San Jose National Technical Symposium, a TGCC Board of Directors meeting and its review for the general membership, and continued topics of interest to the local systems engineering community.

During the coming year, the TGCC is striving for added value to the local membership through increased communication and interaction. To this end, we have enlisted the participation of Ms. Nancy Wilks (wilks_nancy@ssf2.jsc.nasa.gov) as our local Membership Chairperson. If you have any lessons learned or successful efforts concerning membership in your own chapter, please feel free to forward them to her.

The issue holding utmost importance for the TGCC is the needed improvement in exchange of membership data and funding between the local and national levels. This item was discussed at some length during the national Business Meeting sessions in San Jose, and we are looking forward to improved lines of communication.

Two areas of local news that will greatly affect our chapter in the months to come are the overwhelming support given to Space Station by the Congressional vote this summer, and the tremendous potential for shakeup in the Texas Medical Center area due to possible national health care plans. Each topic will have great impact on the way systems engineering is viewed and used as the space and health industries learn to provide high quality products and services with less people and materials.

Midwest Gateway Chapter

Dean Bristow

The Midwest Gateway Chapter (St. Louis-based) has found that a mix of dinner programs, tours, and seminars appeals to our members. In the five programs we have held in 1994, the average attendance is approximately 25, equivalent to one half our current membership.

"Systems Engineering for the Comanche" was the subject of our January Dinner Program. Mr. Kent Chapman, Principal Software Engineer with PRC, discussed the challenges faced by the U.S. Army and Boeing-Sikorsky in applying Systems Engineering to the development of the Comanche scout attack helicopter.

In February, Mr. Larry Olson of McDonnell Douglas traced the "Evolution of Cockpits" in a combined tour and demonstration of McDonnell Douglas flight simulation facilities. A former Air Force F-15 pilot, Mr.

Olson demonstrated the benefits of helmetmounted displays and integrated controls.

We were honored to have Dr. Jerry Lake and Mr. James Brill present "Systems Engineering in Your Organization" at our March dinner program. They used a 16 question on-the-spot survey for a composite assessment of our organizations and then presented recommendations for improvement. A complementary program was given by Mr. Jack Ring of IBM Consulting Group at our June dinner program. Entitled "Secret of Concurrent Engineering, Innovation and Productivity", Mr. Ring's presentation revealed traps many Systems Engineering organizations fall into and the secrets to staying out. Our spring/ summer season concluded in July with the annual preview of papers selected to represent the Midwest Gateway Chapter at the annual NCOSE symposium.

NCOSE Officers & Board of Directors

President: George Friedman, (310) 201-3311
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Govt./Academia: Scott Iverson, (206) 543-5398
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Region II: Southwest

Govt. /Academia: Elliot Axelband, (213) 740-8615
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Govt./Academia: Julian Holtzman, (913) 864-7759
 Industry: Jim Lacy, (214) 341-0022

Region IV: Northeast

Govt./Academia: Stan Weiss, (617) 253-3537
 Industry: James Martin, (201) 386-4485

Region V: Southeast

Govt. /Academia: Frank Fogle, (205) 544-2344
 Industry: Larry Pohlmann, (703) 847-1115

Directors-at-Large: Jerry Lake, (703) 751-7987
 CAB Chair: Ginny Lentz, (301) 493-1440

Best Practices Data Base Taxonomy

S. McHale

The attached information represents an initial taxonomy of a data base for "best" practices. Each item represents, potentially, an area in the SE process for which the practice applies. This is taken from information published by the Processes WC in the Proceedings of the Fourth Annual Symposium of NCOSE, Vol. II. The data base will carry the appropriate "process tag" and may be used to retrieve "best" practices according to the applicable process element(s). Your comments are invited. We hope to discuss this with other WGs at the January meeting in Houston. Send responses to:

- ⇒ Ed Gorki at dkmd52a@prodigy.com
- ⇒ Jim Ray at amsatre%adas@st.louisemh7.army.mil
- ⇒ Bob Pikul at BobP@mitre.org

INITIAL DATA BASE ORGANIZATION

SYSTEM MANAGEMENT

- Planning
- Subcontract Management
- Intergroup Coordination
- Tracking and Oversight
- Configuration Management
- Quality Assurance
- Risk Management

ORGANIZATIONAL

- Process Management
- Training
- Technology Management
- Environment & Tool Support

ENGINEERING PROCESS

- Functional Analysis
- Requirements Analysis
- Trades & Criteria
- Synthesis and Design
- Verification and Evaluation

GENERAL INFORMATION

NCOSE JOURNAL Nearly Complete

Jeff Grady

The first issue of the NCOSE Journal is taking final form and will be sent to you during the month of October at no increase in cost to you. The policy for supporting the cost for subsequent issues will be finalized at the January 1995 business meeting. The authors for the initial issue were invited by virtue of criteria selected by the Editor and Board at the January 1994 business meeting: NCOSE member and a published author, or a past, present, or future elected President of NCOSE.

All future issues will be open to all NCOSE member authors and the first such issue will be published in late June 1995. We will jointly publish an issue with IEEE AESS in late 1995 as well. In 1996 and thereafter, NCOSE will publish three independent issues per year plus one joint issue with IEEE AESS. You are encouraged to submit your work to the Editor In Chief: Jeffrey O. Grady, 6015 Charae Street, San Diego, CA 92122, (619) 458-0121, fax (619) 458-0867, jgrady@ucsd.edu. Publication of your work will be expedited if it is provided in electronic media compatible with Microsoft Word For Macintosh, but other formats including IBM are acceptable, Graphics should be in or easily convertible to Claris Draw (MAC) or compatible format. Your work will be assigned to an Associate Editor who will draw on help from one or more NCOSE reviewers. The editorial staff will do their best to not only select the best work from our membership but will work with the author to migrate reasonable work in that direction.

To be selected for publication by the editorial staff your paper should be: thought-provoking and focus on a topic of interest to system engineers; original work not otherwise published; consistent with NCOSE purposes; and free of commercialism and personalities. Your paper should advance the state of our profession. You are encouraged to provide manuscripts in the following areas: systems engineering processes/practices, systems engineering history, future trends in systems engineering, and the ultimate foundation of systems engineering in science, mathematics, and human psychology. These papers should include references to the work of your colleagues with special emphasis on papers in symposium proceedings (and the CD ROM should simplify this problem) and published works in our field.

You may also submit letters to the editor and re-

views of system engineering books for publication. These will be allocated a percentage of the total page count and if the supply exceeds that allocation, the Editor will be selective.

Recruitment of the editorial staff is now underway with the help of Elliot Axelband, Brian Mar, and Larry Pohlmann. As the associate editors and their reviewers come on board, your papers will begin to flow to them, be negotiated with you, and returned to the Editor In Chief for final selection and integration into future issues of the journal. Some papers, particularly those appearing to state a formal NCOSE position, may require approval of the Technical Board.

Systems Engineering List Serve

Bill Schoening

A list serve is a service that reflects and distributes messages to subscribers without requiring the sender to know the addresses. You can obtain information on how to subscribe to one such service by sending a message over Internet to: MAJORDOMO@WORLD.STD.COM.

Put just three lines in the body of the message:

HELP
LISTS
END

You will receive a return message that includes instructions and a long list of lists to which you may subscribe. Systems-engineering is the main list for us.

There have been several worthwhile exchanges, including one at the end of August on the subject of SE in the commercial arena. Beth Clark, one of our members, sparked the discussion that drew some interesting and varied responses. Message titles such as 'Re: Commercial SE' help sort the mail. If you not interested, delete is quick and easy.

The service is public; every subscriber sees the messages. However, not every subscriber is interested in SE. Occasionally some warped personality will get on the system and flame (rude and crude). When ignored, flammers will go somewhere else to get a reaction.

Finally, you can unsubscribe very simply. It is hard to pass up trying such an inexpensive system.

Literature Searches and NCOSE Papers

Bill Schoening

Barney Morais and the Communications Committee have been trying to have abstracts for individual papers in the

Symposium Proceedings listed in several on-line databases. Librarians can perform literature searches on authors, titles, and key words using these databases. NCOSE has sent copies of past Proceedings to both COMPENDEX (also called Engineering Index and the largest such service) and DATA-STAR. Both are accessible via DIALOG, an on-line system that should be familiar to your local librarian. In addition, we are trying to get the table of contents listed in the Index to Scientific & Technical Proceedings which is published quarterly in print and on CD ROM. A literature search of several authors on COMPENDEX and DATA-STAR at the end of August failed to turn up papers from 1992 and 1993. However, these services are notoriously slow at updating their systems. We will keep you informed about progress and names of other similar services that are interested in listing our papers.

RDD-100 List Serve

Bill Schoening

Rick Steiner owns a list serve for RDD-100. To subscribe, send a message to: rdd-100-request@titan.fullerton.edu with the word SUBSCRIBE in the body of the message. You will receive instructions by return mail. To send mail to the list, send it to: rdd-100@titan.fullerton.edu

NCOSE Via Internet

Bill Schoening

Do you have a limited travel budget? Are most of the people in your NCOSE chapter from your own company? It's time to reach out with e-mail over Internet to those other isolated colleagues with similar interests. All you need is access to Internet through your company, university, military organization, or one of the commercial services such as America On Line, Delphi, or CompuServe. From home or work you can nearly instantaneously communicate with colleagues around the world (my wife in St. Louis exchanges messages with librarians in Australia and the Ukraine). Bulletin boards and list servers are being used by members to ask questions, share important ideas, or just chat.

How do you find the other NCOSE members? We are not a secret organization hiding in cells to escape detection by the enemy! The easy way is to sign up with the NCOSE e-mail Directory. Not only will you receive a list of members with their e-mail addresses, but you will also receive lists of working group chairs, and regular updates to the various lists.

The NCOSE e-mail (Internet) Directory now has the names, phone and fax numbers, and e-mail addresses of over 200 members. Temporarily, this list is being kept separately from the NCOSE membership database until all members have either agreed or declined to be included

in a full Membership Directory. To maintain each member's right to privacy, only those who send their request by e-mail or fax to Bill Schoening are on the list. Members without e-mail can be included as well. J Holtzman posts the Directory on the NCOSE Bulletin Board. To be included, send a message to:

schoening@mdafltsim.mdc.com, or
m138022%SLRC1.decnec@mdagwy.mdc.com, or
Fax: 314-777-1139.

Reflections on NCOSE Symposium Papers

HOW TO WRITE A GOOD PAPER Part1 of2

A commentary by Sarah Sheard, Communications Committee Chair.

The following suggestions about paper writing have been accumulating in my mental "in box" for a couple of years. I would appreciate any feedback; send to: sheardsarah@lfs.loral.com if you have any comments. I will write a second paper in the next issue about making good presentations, and on the difference between papers and presentations.

PICKING A TOPIC: Try to determine what you know or have learned that other NCOSE members would be interested in. Very few of us are just "cranking the handle" and plodding mechanically through a predetermined process. By nature, systems engineering deals with unprecedented systems, so we all face original obstacles. Review those obstacles - are they obstacles other NCOSE members might be struggling against as well? If so, resolve to tell others what you have learned.

OBJECTIVES: Know what your purposes are, and be sure to tie your paper's objectives as closely to the needs of the NCOSE population (your users) as you can. Several common purposes are:

- a) to become known in the SE community (as an individual and a company)
- b) to prove competence and progress to the academic community
- c) to share information in order to attract collaborators
- d) to accumulate "authorship points" offered by some organizations
- e) to justify being sent to the conference
- f) to advance the state of systems engineering in NCOSE, your country, or the world.

In my opinion, the authors of the best papers do not try to win the "best paper" awards. They instead try to

share information others would be interested in learning, and work very hard to be sure the paper says that and only that. Responding to user needs is the surest way to make your paper valuable. To determine those needs,

- a) Note what you most needed to learn before you did this,
- b) Search previous Proceedings for what unanswered questions appear most often and
- c) ask your colleagues!

SET YOUR CONTEXT: Academic papers usually begin with a Background or History Section, Industrial papers often state the conclusions up front, to allow managers to determine whether or not they need to read further. Both approaches have been used to an advantage in NCOSE, but whether or not you start with a History, the context of your paper needs to be clear. Explain the rationale for the project and possibly even for the paper. I find that relevant personal stories enhance reader interest in the paper, thereby enabling you to make your points more effectively.

REQUIREMENTS: If you are writing a team paper, you will have to specify interface requirements, such as who writes which sections, by when, and who reviews. You might want to write a statement of work, with milestones, which you can do even if you are the only author!

WRITING THE PAPER: A NCOSE charter member, who shall remain nameless, told me last year that he went into engineering rather than English because in engineering you don't have to write papers. So rest assured, if you hate writing, you have plenty of company!

In *The Mythical Man-Month*, Fred Brooks suggests, "Build one to throw away." This certainly applies to writing papers. To start, you can just write down some of your more pressing thoughts. Alternately, you can start with what you think may to be the introduction, or perhaps make an outline first, but definitely plan to do at least one major rewrite. Knowing it doesn't have to be perfect helps you write the first draft, which usually is the hardest part. Then put it away and think about something else for a few days between drafts - let the subconscious work unperturbed for awhile.

DETAILS: Using plenty of relevant examples helps clarify the point you are making in the minds of the audience. Try to have at least one example for each major point; more if you are generalizing. Concrete examples not only make the paper more interesting, they also help demonstrate the truth of your assertions.

GETTING COMMENTS ON YOUR PAPER BEFORE SUBMITTING: Who reviews your paper should depend on the purpose of the review. For verification purposes,

ask for comments from congenial colleagues -- those who tend to share your ways of thinking. These people can verify that you made your point succinctly and clearly, that your examples support your conclusions, and that the paper is "a good read."

But once in a while, especially if you think your ideas might be truly important, or if you have more than the average amount of confidence, consider asking those you chronically disagree with you to look at your paper as well. This constitutes a severe form of validation testing. You know they will tell you you're wrong; the value will be the spin they put on what they believe is correct. Their strongly different views may point out another dimension you didn't see. **You** can use their ideas to enrich your paper, or you can ignore them.

DELIVERY: Clearly, you must conform to externally applied standards in formatting and mailing the paper. You don't want to put yourself into the symposium committee's "dog house".

CONCLUSION: The paragraph titles above suggest that one can use the systems engineering process to good advantage when writing a paper for NCOSE. Of major importance, I think, is clarifying who your readers are, what they want, and how they are going to "use" your paper (for reference, an overview, as a standard, as the starting point for further discussion with your group?). Then write to that purpose.

Some Thoughts on the Trends in Symposium Papers

A commentary by Bill Schoening, Chair, Technical Presentation Committee, **1995** Symposium.

Two characteristics of NCOSE papers over that last three years stand out for me: (1) there has not been any real increase in the percentage of papers blatantly non-DoD or non-NASA; and (2) concrete examples supporting the systems engineering discussions in the papers are relatively uncommon.

My research was something less than scientific, but I did read abstracts, conclusions, and scan the contents of the papers published in the Proceedings for the last three years. As chair of the technical presentations committee for the 1995 symposium, I wanted a better understanding of past symposia and a feel for trends.

Despite a lot of "bar talk" about broadening the appeal of NCOSE beyond DoD and NASA, the papers do not support a trend. In both 1992 and 1994, 16 percent of the papers were clearly outside the DoD/NASA arena. In 1993, 22 percent were in this category. I did not consider papers on requirements management tools or lists of courses at various institutions to fit my personal need for topics blatantly outside the DoD/NASA arena. There is

nothing wrong with any of those papers; I was just hoping to find a significant trend toward commercial applications of systems engineering, Energy, transportation, and environmental examples are enough of a departure to satisfy my personal desires, even if they are not strictly commercial.

As I reviewed the papers, I was startled by how many did not have concrete examples supporting the discussion. Richard Feynman always wanted examples to help him understand theoretical discussions in physics. Being noticeably less intelligent than he, I find it almost impossible to make much sense out of anything without a concrete example at hand to test the statements being made. I appreciate paper writers who provide suitable examples so I do not have to scavenge around for them on my own.

To me, the best choices for examples are the actual situations that spawned the thoughts in the paper. For example, "The value of requiring an engineering team to re-examine the allocation of functions to components early in the program was demonstrated on my radar antenna development program when . . ." That author has just transported me into the room with those engineers. I can think, feel, and react the systems engineering issues being described.

These have been some very personal observations about NCOSE papers. I hope that others will step forward with their own views so that authors can gain a better understanding of what the audience wants to hear about.

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Sam Harbaugh

Were you wondering how NCOSE members might get hooked onto the e-mail reflector?

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Low tech. but it's free! Thanks to Florida Institute of Technology for the free service. Sam's personal mailbox is: HARBAUGH@ROO.FIT.EDU

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INSIGHT welcomes expressions of all views from readers. Your expressions should be kept as brief as possible and may be condensed. A name, mailing address, and telephone number must accompany the letter. See page 2 for contact and address information.

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NCOSE Chapter Reports for future issues of *INSIGHT*

James Sanchez

Chapter presidents, let the world know about your local chapter! The goal of *INSIGHT* is to publish brief reports from every chapter, so be sure you submit a chapter report for inclusion into the next issue. We ask that you limit articles to 150-200 words. Include the name of the chapter, recent events, and upcoming dates for the *Calendar of Events* (see page 9 for more information).

In addition, forward Chapter newsletters so that articles that are of interest to our readers can be included. The *INSIGHT* editing staff will gladly review and cull articles for future issues.

Chapter reports are due by November 30 for the December issue.

A name, mailing address, and telephone number must be sent with the material. Electronic mail is graciously accepted and preferred. See page 2 for contact and address information.

Book Review

James Sanchez

Would you like to share your views on a recent book related to systems engineering? Then, write a review for *INSIGHT*. The review should include a catchy byline to attract the reader's attention, and a one to three sentence first paragraph that entices the reader further. In the body of the review, include the title of the book, the name of the author, the publisher, the suggested price for a single copy of the book, the number of pages in the book, the name of reviewer, and 15-60 words about the reviewer. Due to space limitations the Book Review must be limited to 1/2 page of *INSIGHT*. See page 2 for contact information

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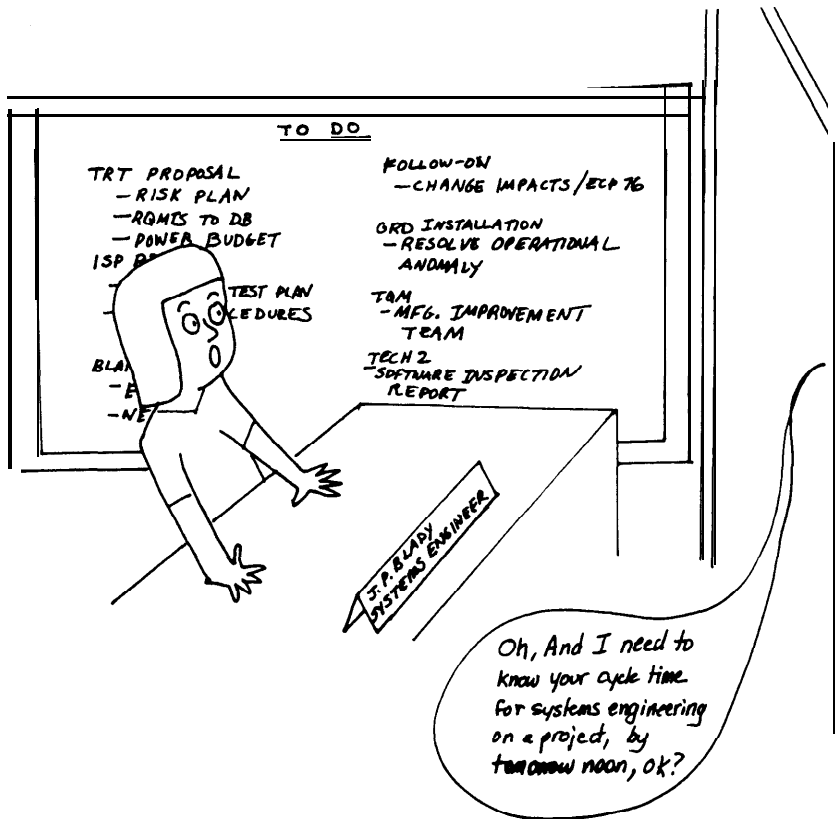
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**NCOSE INSIGHT Challenge!**

Sarah Sheard dares you to top her cartoon! If you have an original cartoon (your own, of course!) that you would like to see published, send it to the editor for consideration. Please **ensure** that your entry is professional and pertinent to systems engineering. Our goal is one cartoon per issue,

Inside This Issue:

NCOSE 1994 Symposium Highlights!

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